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Brainerd, Lyman B.

The steam boiler and fly wheel lines of insurance

[New York]

c1917

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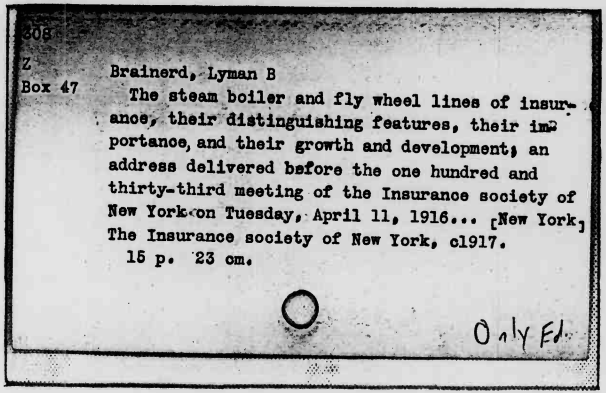

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The Steam Boiler and Fly Wheel Lines of Insurance; their distinguishing features, their importance, and their growth and development.

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AN ADDRESS

DELIVERED BEFORE THE ONE HUNDRED AND THIRTY-THIRD MEETING OF

The Insurance Society of New York

ON

Tuesday, April 11, 1916

BY

LYMAN B. BRAINERD

President

The Hartford Steam Boiler Inspection & Insurance Company

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The Steam Boiler and Flywheel Lines of Insurance.

THEIR DISTINGUISHING FEATURES, THEIR IMPORTANCE AND THEIR GROWTH AND DEVELOPMENT.

There has been during the last half century a marvelous growth and development in all of the more important and promising lines of human endeavor and adventure. This is quite true as relating to all of our standard industries; but it is particularly true as relating to the business of insurance,—embracing all the numerous lines, as one of the co-ordinate industries of our country. With respect to the industry of insurance, this growth and development has been so persistent and rapid, its character or quality has been so substantial and permanent, its volume has obtained such large dimensions, in its breadth and in its scope, it has become so extended and so diversified, that it taxes the strongest and best equipped mind to fully appreciate and comprehend its significance or the measure of its magnificent proportions. In this period of time our national population has increased nearly twice, or speaking broadly, from 35,000,000 to a population of 100,000,000; and our national wealth has increased nearly eight and one-half (8½) times, or from $20,000,000,000 to $187,000,000,000. But in this same period of time premiums paid annually for fire insurance have increased more than twelve (12) times, or from $25,000,000 to $338,000,000, and capital employed has increased more than eight (8) times, or from $69,000,000 to $663,000,000; and premiums paid annually for life insurance have increased more than thirty (30) times, or from $21,000,000 to $647,000,000, and capital employed has increased more than seventy-one (71) times, or from $64,000,000 to $4,595,000,000. These figures relate only to the fire and life lines of insurance, and only to companies reporting to the Insurance Department of the State of New York. However, fifty years ago these two lines of insurance, constituted substantially all that pertained to the industry of insurance.

It follows, therefore, that within the past fifty (50) years, there has been conceived and skillfully developed and placed upon a sound and permanent basis of indispensable usefulness, all of the present so-called casualty lines of insurance, numbering upwards of forty (40) distinct and independent lines. In the conduct and development of these lines of insurance they have already been carried to high levels of efficiency and service, and today constitute a very substantial and important part of the industry of insurance. Their importance to our social, commercial and industrial life is best attested by the fact that, during last year (1914) there were no less than 224 incorporated stock companies actively operating and conducting one or more of these various lines of insurance; and the amount paid to them in premiums exceeded $153,000,000, while capital employed exceeded $544,000,000.

(It should be stated, however, that in certain instances capital employed is duplicated in the casualty and life lines of insurance,—in instances where a life company is doing directly a casualty business.)

Surely these figures are profoundly impressive and stand alone and unapproached by any other industry of a kindred character. By this I mean an industry as delicately poised, and the marketing of whose product is as sensitively adjusted to the fancy and favors of a patronizing public, as is the industry of insurance. The industry of insurance is, as it seems to me, to a greater extent than any other industry, dependent upon constructive and administrative ability of the highest order; and it is, to a greater extent than any other industry, dependent upon public confidence and personal favor, attracted and won by a reputation publicly earned for not only dealing honorably and within policy provisions; but even benevolently and irrespective of policy provisions. The insuring public hold, and very properly, an Insurance Company to a very strict accountability; and occasionally to a standard of morals in management that is neither inspired nor reciprocated by them. It is one thing, gentlemen, to create and establish an industry in a populous locality where the needs of the people require the output, where a market is waiting to absorb the product; but it is quite another thing to create and establish an industry, or even a new line of insurance, in advance of its recognized need by the people, or before the people have been educated up to a sense of their need of its product or protection.

I am quite conscious that I have not as yet touched the subject assigned to me. I have been prompted by two reasons to make these preliminary observations, (1) for the purpose of bringing afresh to our minds the status of the industry of insurance fifty years ago, and the wonderful development and expansion that has since been achieved; and (2) I am somewhat reluctant to disassociate myself from figures and a subject as inspiring as are those pertaining to the industry of insurance, and especially for a subject and figures as circumscribed and limited as are those pertaining to the steam boiler and flywheel lines of insurance.

Their Distinguishing Features.

The steam boiler line of insurance bears the honor and carries the scars, and it has suffered the fatalities incident to being one of the first of our present casualty lines to be taken up. This year marks its fiftieth anniversary, it having been taken up in 1866. The flywheel line of insurance is of more recent origin and it is one of the younger of the casualty lines, it having been taken up in 1901. The features that dignify and distinguish these two lines of insurance from other lines of insurance are basic and fundamental. They rest squarely and firmly upon the underlying principle of *conservation*; as contrasted with that of *compensation*, underlying the other lines of insurance. The theory being that, the primary object to be obtained is the prevention of accidents, and as a natural sequence, the prevention of losses. That the supreme service any line of insurance can render to an assured is protection from, and not indemnity for, losses. That the principle upon which these two lines of insurance are founded, and upon which they have been developed and built up, is scientifically and economically sound, cannot be questioned, when we consider that no money indemnity can fully compensate for a loss, in which property and lives are destroyed, that could be averted by a reasonable expenditure of money for the maintenance of a proper supervision and an efficient inspection service. It should be borne in mind, that any expenditure for service that prevents an accident does not impoverish a community, that the amount spent simply passes in the main from the treasury of a corporation into the pockets of individuals for labor performed, and this fact should appeal to the public and popularize these two lines of insurance; whereas, any amount

paid as indemnity or for compensation is confirmatory evidence that a loss has been sustained and that property of a like value has been destroyed, and to that extent impoverishes a community. As manufacturers using steam for power are our principal patrons, it must at once be appreciated that there is not in money, nor in any amount of it, the equivalent of or full compensation for the preventable destruction of property, with the resultant interference to business, and the possible loss of trade connections through inability to accept and promptly fill orders: and certainly there is no equivalent whatever for the loss of life and irreparable injury to persons. For all losses coming within this class money cannot be considered as "legal tender" as it is in character, unlike and non-convertible into that which was lost or destroyed. To conduct lines of insurance in strict compliance with the requirements of this principle, and especially lines of insurance of the steam boiler and flywheel character, requires the maintenance of a very extensive and a very expensive mechanical organization. It involves the inspection of every boiler and every flywheel and pulley before accepting and binding insurance upon them, as insurance will be granted only in case their construction, installation and physical condition come up to the standard of engineering requirements for safe operation. This in turn requires the maintenance of facilities for inspecting promptly any boiler or flywheel, wherever located in the United States. This statement may at first impress one as being extreme, but when we consider the large number of industrial combinations and concentrations of control, through allied and affiliated interests, having plants in many States, all to be covered under one or a so-called schedule policy, it will appear clear that it is as necessary to maintain an organization with inspection facilities in the remote and non-manufacturing States of the Union, as it is in the industrial centers of New England, if these two lines of insurance are to be properly and promptly conducted and made to serve the interest and the convenience of these large industries. The proprietor of a steam power plant may never have carried either one of these two lines of insurance, but once he has decided to carry them, he is impatient to be covered and will not wait long for the initial inspection to be made as a preliminary to the binding of the insurance and the issuance and delivery of the policy. In order to meet these exacting conditions in the most economical and effective manner possible, it has been found desirable, if not necessary, to divide

the United States into numerous sub-divisions, and to establish in each sub-division, at the most central and important point, having due regard for the natural trend of trade and travel, a branch department with a corps of inspectors and presided over by a Chief Inspector. These branch departments are equipped with men and mechanical tools and appliances required for the proper maintenance of the inspection service throughout their respective districts, and each department is in itself a perfectly equipped steam boiler and flywheel inspection company. By the establishment of from fifteen to twenty-five departments it is possible to maintain an inspection base within reasonable or accessible distance from every boiler and flywheel in the United States.

The initial or first inspection of a boiler or flywheel is an expensive and a time-consuming undertaking. It involves obtaining full and complete data concerning, and accurate measuremen of all objects insured, and very frequently involves the making of a special trip for the purpose of obtaining this information, in order that the policy may be issued and delivered without delay and before an applicant changes his mind, and particularly before a representative of a competing company influences him to change his application. This mechanical data is not only indispensable but well-nigh invaluable, as it continues constantly to be of service as long as the line of insurance is retained and the original objects insured remain in service. Indeed the loss of the line of insurance does not necessarily destroy its value to the insuring company as its value and usefulness are completely restored in after years should the line of insurance be regained and the original vessels inspected are found to be in service as would be most probably the case.

Their Importance To Our Steam Power Industries.

The full measure of their importance to our steam power industries, taking into consideration primarily the mechanical services rendered, and secondly, the insurance protection extended by these two lines of insurance, cannot easily be stated and it would be quite impossible to overstate it. That feature of the undertaking that is unquestionably of supreme importance is the inspection service—the regular, periodical inspection of all objects insured, by mechanics specially trained and qualified to skillfully perform this technical and exacting service.

Speaking broadly and with sufficient breadth to fairly cover the natural fluctuation of such occurrences, the inspection service makes and promptly brings to the attention of an assured the following important discoveries annually, on an average per boiler.

It is found that one boiler in every one hundred and seventy (170) is so mechanically defective and physically unsound, that it is not in a safe condition to operate and is not insurable.

That one boiler in every seven (7) has developed defects of varying degrees of danger, that require prompt attention and not infrequently require the immediate and arbitrary suspension of operations; and that one boiler in every two (2) possesses minor or insidious defects, which, if not promptly dealt with, would soon become dangerous defects.

That one boiler in every three (3) is not entirely free from scale, and one boiler in every seventy (70) is thus affected to a degree more or less dangerous.

A defective stay-bolt is found in one boiler in every sixty (60); and one boiler in every two hundred and seventy (270) is found to be thus affected to a degree considered dangerous.

A fractured plate or head is found in one boiler in every forty (40); and one boiler in every two hundred and fifty (250) is found to be thus affected to a degree considered dangerous.

A defective tube or flue is found in one boiler in every seven (7); and one boiler in every twenty (20) is found to be thus affected to a degree considered dangerous.

A defective pressure gauge is found in one boiler in every fifteen (15); and a defective water gauge is found in one boiler in every thirty (30); an over-loaded safety valve is found in one boiler in every eighty-two (82); a defective blow-off is found in one boiler in every twenty (20); and one boiler is every six (6) has more or less internal corrosion.

That the setting as relating to one boiler in every twenty (20) is found to have become defective through operation, and one boiler in every one hundred and fifty (150) is affected in such manner as to be more or less dangerous to operate.

That one man is injured to every one thousand (1,000) boilers under steam, and one man is killed to every five thousand (5,000) boilers in operation.

This schedule of discovered defects could be very considerably extended, but special mention is made of a sufficient number only to indicate the varying character and the frequency in which

defects occur, incident to the generation of steam for power. These discovered defects are brought promptly to the attention of an assured, and it is required that the more serious and important ones shall be given immediate attention, and a close watch is kept and frequent inquiries are made by the insuring company, with respect to the progress that is being made in carrying out the company's instructions relating thereto.

We certainly will come far short of placing a proper value upon the early discovery and prompt repair of these and similar mechanical defects, unless we give due consideration to the character and gravity of happenings that would almost inevitably follow in due course if these defects were not discovered and repaired before a violent explosion occurs, and at a time when they can be dealt with and not interrupt the operation of a plant.

The discovered defects herein mentioned are only illustrative of certain tangible achievements of the inspection service rendered, and it is comparatively easy to determine and to measure their importance and worth. But there are certain intangible and indeterminable benefits derived from the service that it is quite impossible to measure, notwithstanding they are very real and very substantial. I would mention, for instance, the influence of the inspection service upon the operating engineers.

These men occupy important positions of great responsibility, and speaking generally, they are very amenable to instructions and eagerly seek and cordially adopt any suggested improvement that makes for greater economy and more certain safety of operation. They are also very zealous and scrupulously exacting in their care of the boiler room and the boilers and machinery, and earnestly concerned that they shall be maintained in a sound and safe operating condition. These regularly maintained periodical inspections and checkings up, concerning which full written reports are made proprietors, have a very salutary influence and unquestionably inspire a greater degree of care and efficiency than could otherwise be obtained.

It is also pertinent to consider for a moment the cost and inconvenience to an important industry of a forced shut-down, if only for a few days, that is rendered necessary in order to make repairs that could have been dealt with in their incipiency with no interruption whatever to operations, no discouraging or disorganizing effect upon operatives, and no loss of wages either to the employees or to the employer. Indeed, we are justified in

going a step farther than this, and in considering what it might mean to a great industry, and to a large body of operatives, to encounter a violent explosion of a boiler resulting from defects undiscovered and neglected that could have been discovered and repaired with no inconvenience to and no interruption of operations through the maintenance of a vigilant periodical inspection service.

Then, further, there is another and a very substantial benefit derived from the service that I consider not only deserving of mention, but of special emphasis, notwithstanding it likewise is intangible and unmeasureable. I have reference to the extended, serviceable life of a boiler, that is under constant observation, and that is subjected to a thorough inspection periodically, as compared with the serviceable term of a boiler receiving no such care and attention.

In mechanics it is a recognized principle that in the operation of machinery, to secure the highest efficiency and the greatest economy, it requires the constant attention of a competent mechanic or engineer to make certain that any and all mechanical disarrangements that constantly occur and which, if not promptly attended to, would in a short time force a shut-down, be promptly discovered, and corrected without delay; and if this be true concerning the operation of machinery, how much greater the need of the maintenance of an efficient inspection service when we consider the intricate and complex anatomy of a steam boiler —in many respects as complex and intricate as the anatomy of the human body.

It will, indeed, be impossible to even approximate the difference in the operating cost to an industry, whose mechanical equipment is running smoothly and without interruption, and every part thereof performing its proper function, as compared with a similar industry, with its equipment running irregularly and unnaturally, and no two companion parts working together co-operatively, and that is subjected to frequent shut-downs for the purpose of making minor repairs. Nor is it possible to measure, in years, the prolonged usable life of a boiler that is regularly inspected as compared with one that receives no such attention. But that there is greater economy in the operation of a plant running normally and a longer term of service, cannot be questioned, and these are mighty factors in the economic operation of a steam power plant. The service rendered, therefore, by any line of insurance that prevents, or that contributes

substantially toward preventing, the explosion of a boiler and the resultant destruction of property, and the possible injury and death to persons, is of sufficient importance to any industry, to be carried primarily for its protective value, but it is also deserving of being carried as an operating economy. It is not, however, contended that all accidents and explosions can or will be prevented, as in this service the human element is too dominating a factor. But the high standard of efficiency to which the inspection of steam boilers has been carried and is being maintained is reflected in the low loss ratio pertaining to this line of insurance during its entire history now extending over nearly fifty years, and amounting to approximately 10 per cent. of premiums received. It is obvious, therefore, that the inspection service as maintained has extended to steam users a protection averaging within approximately 10 per cent. of full and complete protection from explosions, and with respect to this loss ratio a very substantial proportion can be traced directly to the fallibility of men and material. It should be borne in mind, however, that this low loss ratio is obtained only by plowing into the inspection service fully 50 per cent. of all premiums received. This inspection service, notwithstanding its protective and economic importance and its cost to maintain, is supplemented and supported by a definite contract of insurance pledging full indemnity to an assured for any loss resulting from an explosion that no human agency can foresee and prevent that comes within the contract terms and provisions of the policy. To define more definitely, the importance or the value of the services rendered by these two lines of insurance, to the steam power industries of this country, one must be qualified to measure, in the currency of this country, the value of a service that will protect property from needless destruction and persons from wanton injury and death.

Their Growth and Development.

In the growth and development of these two lines of insurance there are, in my opinion, substantial reasons justifying both disappointment and surprise—disappointment at the sluggishness of their growth with respect to volume; and surprise at the agility of their development with respect to breadth of coverage.

This present year the steam boiler line of insurance will round out and complete its half century of service and the total

premiums paid last year (1915) for its service and insurance were the largest in its history, but amounted to less than $3,000,000, an amount averaging less than $62,500 per State. This premium income is equivalent to an average annual growth of less than $60,000 per year and less than an average annual growth of $1,250 per State.

This present year the flywheel line of insurance will complete its fifteenth year of service and the total premiums paid last year (1915) for its service and insurance were the largest in its history, but amounted to less than $230,000, an amount averaging less than $4,800 per State. This premium income is equivalent to an average annual growth of less than $15,400 per year, and less than an average annual growth of $320 per State.

When we consider the magnitude of our steam power industries, the enormous investment in buildings and costly machinery, and the large concentration of property and persons at innumerable points, conserved and insured, the amount paid annually in premiums impresses me as being inconsistently small and out of all equitable proportion to either the value of property and persons thus conserved and insured, or the value to an assured of the dual service rendered by these two lines of insurance.

In their development there is reflected in the gradually extending breadth of coverage the sharpness of competition to which these two lines of insurance are subjected. The strength and keenness of this competition will be best understood and appreciated when it is considered that the total amount paid last year (1915) for steam boiler insurance throughout the United States was only $2,957,852, and that this premium income was distributed between no less than thirteen companies, an amount averaging only $227,527 per company and only $4,740 per State.

The total amount paid last year (1915) for flywheel insurance throughout the United States was only $228,624 and this premium income was distributed between no less than ten companies, an amount averaging only $22,862 per company and only $476 per State.

In view of the extended and expensive organization required to be maintained in each State and frequently at several points in a given State, it is at once apparent that a company's only hope of being able to conduct these lines of insurance with any hope of profit is by pressing for a sufficient volume to maintain their respective organizations and in controlling a sufficient number

of boilers to occupy the time of their inspectors. This pressure has forced competition not only with respect to rates, but quite as severely with respect to new points and breadth of coverage, and therefore it is of interest [becomes very enlightening] to compare the coverage of the first steam boiler policies issued with that of policies issued today.

The first steam boiler policy issued in this country was in February 1867—nearly fifty years ago. The policy was issued in the principal sum of $5,000, but it was limited and made to apply and cover $750 on boiler No. 1, $750 on boiler No. 2, $1,000 on boiler No. 3, and $2,500 "on machinery and property adjoining said boilers." It seems clear that it was the intent to cover only the boilers themselves and the necessary machinery immediately connected with and surrounding the boilers, and no other property whatsoever. This policy also contained many primitive and restrictive warranties, and particularly provided that:—

(1) "That the company would not be liable for any loss or damage except while the property insured is in the actual care of, and managed by, and used in the regular business of the assured.

(2) Nor for loss or damage to property owned by any other party than the assured.

(3) Nor for any loss or damage where a boiler is placed in charge of a person known to be grossly incompetent or negligent.

(4) Nor for any loss resulting from the neglect of or deviation from the laws of police regulations made to prevent accidents from boiler explosion.

(5) Nor if there is any other similar insurance upon the property without permission endorsed upon the policy.

(6) Nor if any person owning or using said boilers or any interest therein, or any employee of such persons at any time discover any defect at all affecting the safety of said boilers, then and in all of the above instances "this policy shall forthwith become void unless the fires shall at once be drawn and the boiler or boilers so affected cease to be worked until such defect shall have been thoroughly repaired."

In contrast, the ordinary steam boiler policy of today covers:

(1) Loss or damage to the property of the assured.

(2) Loss or damage to the property of others for which an assured may be held liable.

(3) Claims for personal injuries and fatalities of employees, and,

(4) Similar claims of any person or persons whether employees or not.

The difference in the breadth and scope of these two coverages is clearly apparent. Under the coverage of today there is no chance for salvage in the settlement of a loss, assuming that the assured sustains a loss from these several sources sufficient in amount to consume the face of the policy, while under the coverage of the first policy issued it is doubtful whether a very large proportion of claims recognized and paid today, could be established and their payment legally enforced. It is pertinent to consider in this comparison the practicability of selling today steam boiler insurance under a policy limiting the company's liability for loss to property of the assured only, and only while in the actual care of and managed by the assured, and while containing a provision denying liability for loss where a boiler has been placed under the care of a person known to be grossly incompetent or negligent, or where the fires are not drawn and operations cease when any person owning or using said boilers and having any interest in them, or any employee shall at any time discover any defect at all affecting the safety of said boilers. And even under these restrictive provisions the insurance covered the boilers only and the machinery and property adjoining said boilers. The rate obtained for this specific and limited coverage for one year would be today quite acceptable for a three year term, under our present breadth of coverage.

The advance and improvement in underwriting practices have kept pace with, and in fact, abreast of, the wonderful growth of the business and the requirements of the insuring public. This progress continues today under an impetus forced by competition that is well nigh beyond control and finds its expression in continually broadening and liberalizing policy conditions to such an extent that we are fast approaching a form of policy stripped of many protective provisions and conditions defining the limitations of liability assumed that hitherto have been considered as fundamentally important and essential to sound underwriting practices.

In conclusion, I desire to emphasize by repeating certain important points I have endeavored to make prominent with respect to matters considered in the several sub-divisions of my subject, namely :—

(1) That the feature that dignifies and distinguishes these two lines of insurance from other lines is the expenditure of fully 50 per cent. of premiums received in maintaining an inspection service primarily for the prevention of explosions, and consequently, the prevention of losses; thus protecting and conserving both property and persons. It is obvious, therefore, that with respect to other lines of insurance the contract is solely for indemnity, but as relating to these two lines of insurance the contract is primarily for service, but as strongly supported by a pledge of indemnity for such accidents as no human agency can foresee and prevent.

(2) Their importance to our steam power industries is in having mechanical defects discovered promptly and brought to the attention of proprietors that they may be dealt with before they become dangerous and before it becomes necessary to shut down for the purpose of repairing said defects. The inspection service is also an important factor in maintaining the boilers and the machinery in a sound and economical operating condition and in greatly extending the serviceable life of a boiler as compared with the serviceable life of a boiler receiving no such care and attention.

(3) Their growth and development from the standpoint of premium volume have been slow and disappointing. With respect to the steam boiler line after a development extending over forty-nine years, the total amount paid last year in premiums averaged less than $62,000 per State, and only $29.57 per one thousand of population; and with respect to the flywheel line of insurance, after a development extending over fifteen years, the total amount paid last year in premiums averaged less than $4,800 per State, and only $2.28 per one thousand of population.

When we consider the magnitude of our steam industries, the large investment in buildings, machinery and stock, all protected and insured at innumerable points, the amount paid annually in premiums must impress one as being inconsistent and out of all equitable proportion to either the value of the property protected on the protective value of the service rendered in keeping the loss ratio down to about 10 per cent. of premiums received, thus evidencing the fact that the inspection service extends a protection averaging within about 10 per cent. of absolute immunity from explosions, a variation so slight as to be well-nigh accounted for by the fallibility of men and material.

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